

# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

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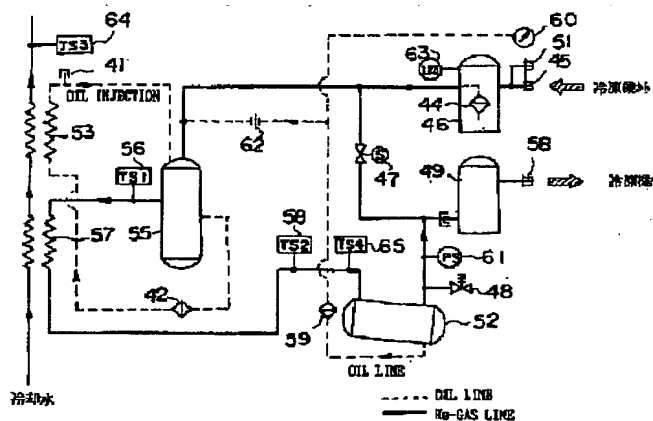
APPLICATION DATE : 31-03-98  
APPLICATION NUMBER : 10086324

APPLICANT : SUMITOMO HEAVY IND LTD;

INVENTOR : ITO KATSUHIKO;

INT.CL. : F25B 9/00 F25B 9/14

TITLE : COMPRESSOR FOR COLD STORAGE  
REFRIGERATING MACHINE



**ABSTRACT :** PROBLEM TO BE SOLVED: To obtain a cold storage refrigerating machine, especially a cold storage refrigerator having lowest temperature reaching 4K or below, in which performance is enhanced by improving the structure of a compressor such that pressure rise is prevented on the high pressure side while increasing difference between high and low pressures of a working gas without varying the machine size significantly.

**SOLUTION:** The cold storage refrigerating machine constructed to supply a refrigerating machine with high pressure helium gas produced by compressing refrigerant helium gas through a compressor and to return low pressure helium gas expanded through the refrigerating machine back to the compressor is provided with a mechanism for bypassing helium gas, not processed through the refrigerating machine, between the high and low pressure sides where a pressure switch 61 is combined with a solenoid valve 47 having a channel diameter for bypassing an appropriate quantity of high pressure helium gas.

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CLAIMS

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## [Claim(s)]

[Claim 1] In the cool storage type refrigerator constituted so that the low voltage gaseous helium to which the high-pressure gaseous helium which compressed the gaseous helium of a refrigerant with the compressor was supplied to the refrigerator, it expanded with the refrigerator, and the pressure fell might be again returned to a compressor The cool storage type compressor for refrigerator characterized by establishing the bypass device of a high tension side and the low-tension side which comes to combine a solenoid valve (47) in which it has the diameter of passage which can bypass a pressure switch (61) and a proper quantity of high-pressure gaseous helium for the gaseous helium which cannot be processed with a refrigerator.

[Claim 2] A solenoid valve (47) is a cool storage type compressor for refrigerator according to claim 1 which serves as the function which makes homogeneity the pressure of the gaseous helium of the high-tension side and the low-tension side in order to prevent the back flow of the lubricating oil of a compressor after a halt.

[Claim 3] The cool storage type compressor for refrigerator according to claim 1 made into the combination of a pressure switch (61), a combination substitute of a solenoid valve (47) and a pressure sensor, and a flow control valve.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a cool storage type compressor for refrigerator.

[0002]

[Description of the Prior Art] A cool storage type refrigerator uses a cold reserving material, it is the refrigerator which can be cooled to a very-low-temperature field, and the class has a GIHO-DOMAKUMAHON type refrigerator (henceforth the GM refrigerator), a joule Thompson style +GM refrigerator, a clo-DOSAIKURU refrigerator, a Sterling refrigerator, etc.

[0003] Drawing 3 shows the configuration of the general GM refrigerator. By drawing 3 , a is a compressor, b is a refrigerator and these are connected by supply line c and return-line d. As shown in drawing 4 , the internal structure of Refrigerator b was connected with the motor 2 which switches the rotary valve 1 for switching installation and discharge of gaseous helium, and the displacer 3, changed the reciprocating motion into rotation, and is equipped with the movement translator 4 for limiting the bound of the reciprocating motion. That is, the displacer 3 with which the gas led to the refrigerator built in the cold reserving material is passed, gas carries out adiabatic expansion with a rotary valve 1, carries out heat exchange to the cold reserving material of the cool storage inside of a plane, and cool storage is serially carried out to the cold reserving material, and it cools to the minimum attainment temperature by this continuous action.

[0004] Gaseous helium is used for a cool storage type refrigerator and especially the compressor in the GM refrigerator as working medium. The body (structure of having the rotation prime mover which carries out the pressure up of the gas) of a compressor has diverted the body of a compressor currently used for the refrigerator for air-conditioning, or the business-use freezer. Moreover, the compressor for refrigerators supplies gaseous helium to the refrigerator which generates very low temperature. Very low temperature is acquired with the chill which it generates within a refrigerator in case high-pressure HERIUGASU supplied from a compressor expands from high pressure to low voltage.

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EFFECT OF THE INVENTION

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[Effect of the Invention] Since the bypass device of a high tension side and the low-tension side which comes to combine a solenoid valve 47 in which it had the diameter of passage which can bypass a pressure switch 61 and a proper quantity of high-pressure gaseous helium for the gaseous helium which cannot be processed with a refrigerator was established Without heightening design pressure or enlarging equipment, in the process in which a refrigerator is cooled, large differential pressure when HERIMUGASU which cannot be processed by the refrigerator side can be processed and a refrigerator is cooled to predetermined temperature can be taken, and the rise of refrigerating capacity can be aimed at. Furthermore, it has the function which makes homogeneity the pressure of the gaseous helium of the high-tension side and the low-tension side.

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TECHNICAL FIELD

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] In a cool storage type refrigerator and the cool storage type refrigerator with which the minimum attainment temperature reaches 4K or less especially, while preventing the rise of the pressure of the high-tension side, not changing size of a device a lot, let it be a technical problem to improve the structure of a compressor and to raise the engine performance of a refrigerator so that the large differential pressure between the high pressure of working medium and low voltage can be taken.

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MEANS

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[Means for Solving the Problem] The low-voltage gaseous helium to which the high-pressure gaseous helium which compressed the gaseous helium of a refrigerant with the compressor was supplied to the refrigerator, it expanded with the refrigerator, and the pressure fell established the bypass device between the high tension side which comes to combine the solenoid valve 47 which has the diameter of passage which can bypass a pressure switch 61 and a proper quantity of high-pressure gaseous helium for the gaseous helium which cannot be processed with a refrigerator, and the low-tension side in the cool-storage type refrigerator constituted so that it might return to a compressor again. Moreover, after the halt, said solenoid valve 47 serves as the function which makes homogeneity the pressure of the gaseous helium of the high-tension side and the low-tension side in order to prevent the back flow of the lubricating oil of a compressor. It is good even if a pressure sensor and a flow control valve should put the combination of a pressure switch 61 and a solenoid valve 47 together.

[0017]

[Embodiment of the Invention] It explains based on drawing 1 . Instead of the bypass valve 30 of the spring type of drawing 2 , it considered as the structure of making the low-tension side bypassing the gaseous helium of the high tension side which cannot be processed with a refrigerator from a high tension side, in the process in which a refrigerator is cooled, with the combination of a pressure switch 61 and a solenoid valve 47. What can set up "entering" and "the end" by the side of a rise and descent may install a pressure switch 61 in a rise and descent side, respectively.

[0018]



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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The piping schematic diagram of the compressor unit concerning this invention.

[Drawing 2] The piping schematic diagram of the conventional compressor unit.

[Drawing 3] The approximate account Fig. of a general refrigerator.

[Drawing 4] The sectional view of a well-known refrigerator.

[Description of Notations]

30 Bypass Valve 47 Solenoid Valve

61 Pressure Switch

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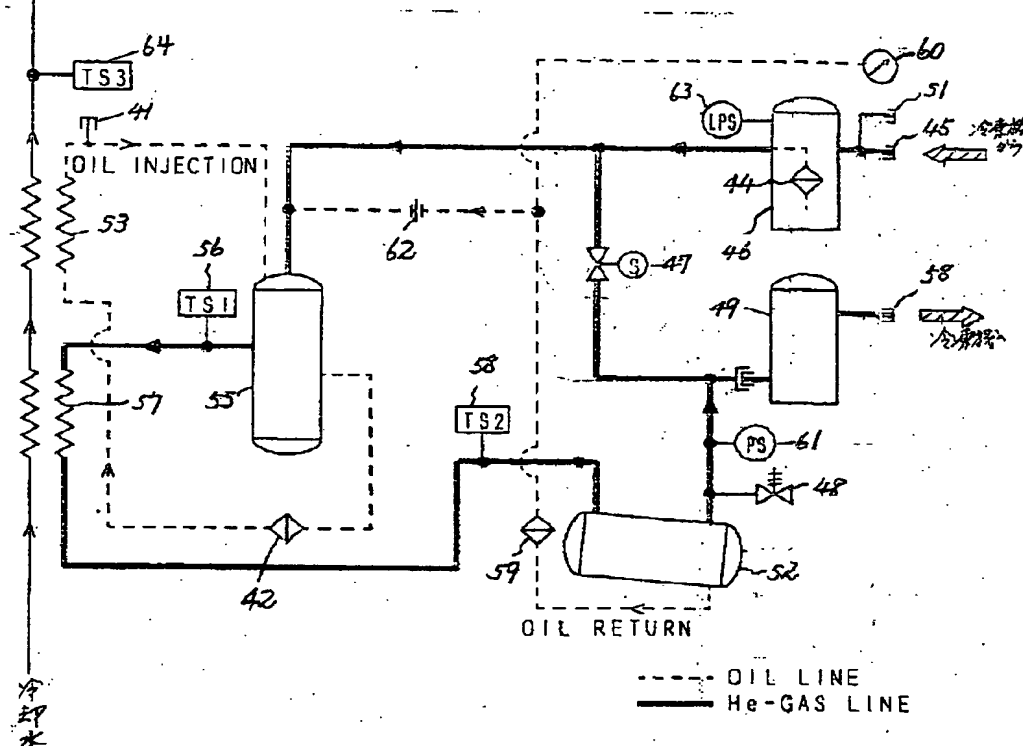
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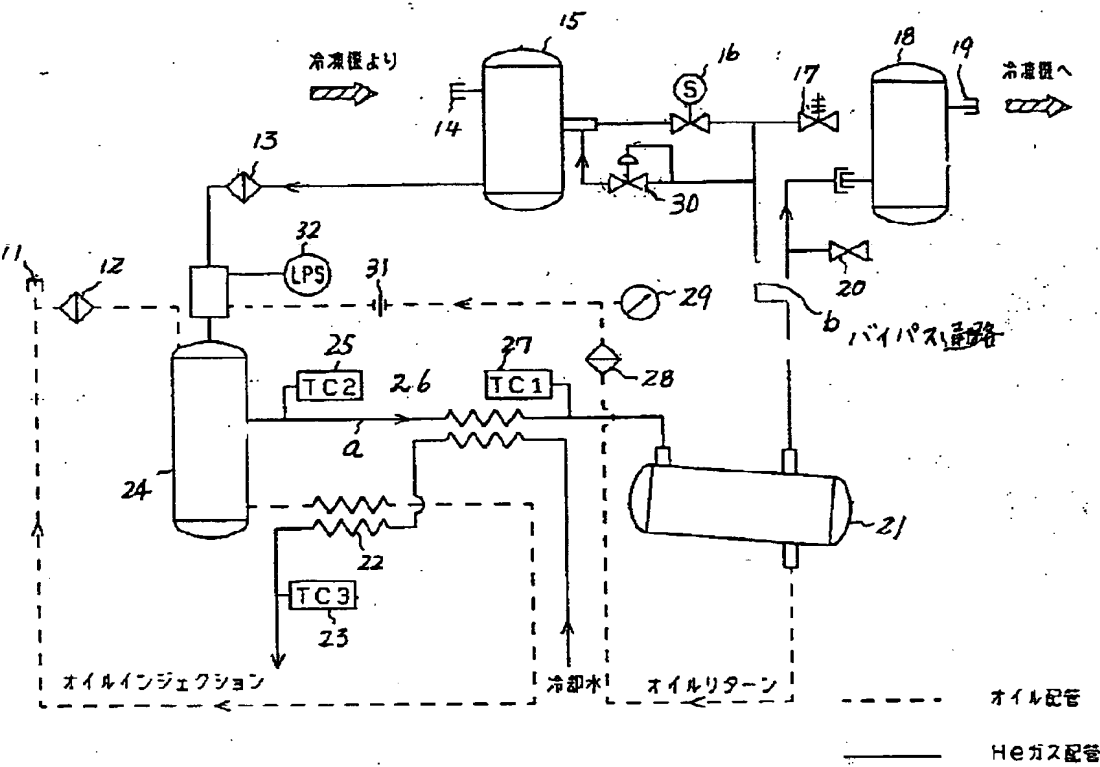
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## DRAWINGS

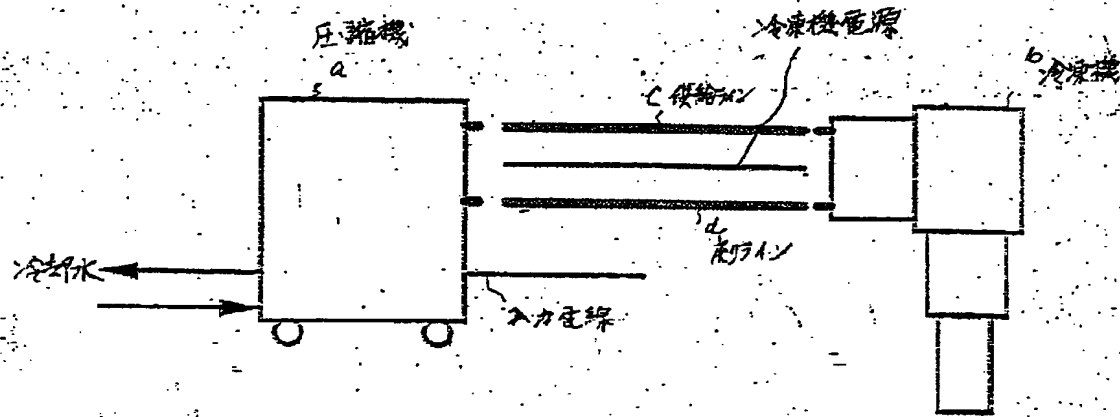
[Drawing 1]



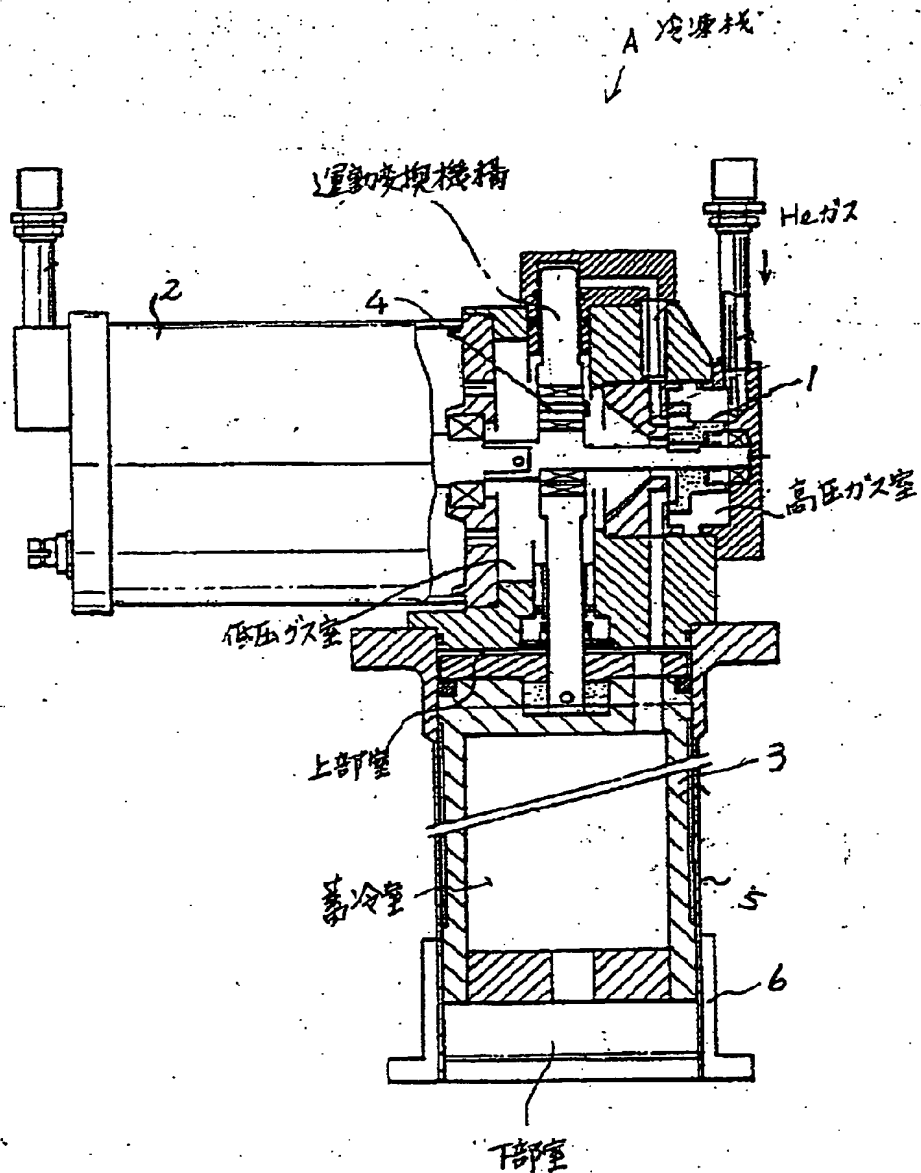
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]